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ABSTRACT

An Opscan 100 optical scanner was used to score test materials received at the Southwest Regional Laboratory (SWRL) during the tryout of SWRL's Instructional Management System (IMS). This document describes the functional characteristics of the optical scanner. Directions for preparing two types of control forms processed by the scanner and sequential operating instructions for the scanner are included together with diagrams of the correct settings for the machine. Sample forms are also illustrated. (DGC)

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ABSTRACT

The Instructional Management System utilizes the OpScan 100 to optically scan test materials received from the schools through the U.S. Mail (ComSys I) and interschool courier service (ComSys II).

This is a description of the functional characteristics of the optical scanner. Directions for preparing Q and K sheets and sequential operating instructions are included.

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IR 002 141

OPSCAN 100 - SCAN TAPE PREPARATION FOR IMS RUNS

At present SWRL utilizes the OpScan 100 optical scanner to score test materials for the Instructional Management System tryout. Raw data from five programs are mailed to SWRL, pre-processed, and then scanned. The resulting Scan Tape is used in the IMS ComSys I and II (mail mode) versions of the tryout.

When making IMS Scan Tapes, the OpScan operator must first preprocess the data. This involves thoroughly checking each test sheet for stray marks, erasures, staples, improperly coded Pupil ID's and other errors which would be inadvertently read or rejected by the scanner. Prior to this stage, the data are checked for missing ID sheets, missing test dates, incorrect Pupil Codes, missing Pupil List numbers and other teacher generated errors.

The OpScan operator completes page one of an IMS log form to indicate scan time and date (Figure 1). The IMS Run Control Sheet-II is filed with each completed run. The OpScan operator also maintains a record of the necessary preprocessing and/or errors in the tape. These are referenced by teacher name and run number.

Functional Characteristics of the OpScan 100

In the OpScan 100 DM system, mark reading is accomplished by sensing differences in the reflectance of light by photocells mounted on a rotating scanning disc. As the light path sweeps across the moving form, the photoelectric cell detects the drop in reflected light caused by a pencil mark. The system's logic then interprets the mark as a

number or letter, codes it into computer language, and records it on a punch card. If there are two or more marks in a given grid, the unique scanning logic of the system will choose only the darkest mark, thereby ensuring accuracy. The system incorporates a "Darkest Mark" feature which eliminates the inadvertent reading of erasures, smudges and other extraneous marks.

The OpScan 100 optically reads 8½" x 11" pencil marked sheets at the rate of 2400 per hour. Since this is accomplished off-line there is no involvement of valuable computer time during the mark reading process.

Forms Terminology

1. A Data Form is an 8½" x 11" source document which may contain alphabetic, numerical, alphanumeric and/or test scoring information.
2. Control Forms
   a. Q Control Form - The Q control form programs the scanner where to look for data on the data form.
   b. K Control Form - The "key" form programs the scanner as to what type of data to look for on the data form.
3. A Response Position is a single marking position which may be pencil marked for optical reading.
4. Density is the number of available response positions per line (the horizontal designation).
5. A Grid is a related group of response positions beginning and ending on the same line. It can be either alphabetic,

numeric or alphanumeric. These marks are placed on the K control form to indicate which grids are alphabetic, the correct answers to a test, the pertinent data within the identification section, and the end of sheet parts.

The directions for preparing Q & K control forms containing PLC density are found in the operator's manual. Figure 2 contains directions which refer to examples found in the operator's manual. Figures 3 and 4 are samples of Q & K sheets used for the IMS identification sheets.

The following instructions are used by the OpScan operator. A more detailed version appears on pages 34-36 of the operator's manual. Refer to Figures 5, 6 and 7 for diagrams explaining these directions.

A. To Begin

1. Push the button labeled "Power" (1)
2. Push "DRIVE" (2)

B. To place magnetic tape on tape drive

1. Thread tape with several winds on the take-up reel
2. Push white and red switch on the top left of the recorder (1)
3. Turn center knob on recorder to "Local" (3)
4. Push "READY/LOAD" (green and white button) (2)

Turn center knob to automatic (3)

Hit reset button on scanner (D)

C. To Scan Data

1. Turn "MODE" knob to "S" position (E)
2. Turn "FORM" knob to "HI" position (12)
3. Turn "LOAD-SCAN" knob to "Q" position (9)

4. If feed rollers are not already operating, push "FEED/HOLD" (3)
5. Place Q-form in hopper
6. Check "ACCUMULATOR" lights for the correct number of marks on Q-form (14)
7. Turn "LOAD-SCAN" knob to "K" position (9)
8. Place K-form in hopper
9. Check "ACCUMULATOR" lights for the correct number of marks on K-form (14)
10. Turn "LOAD-SCAN" knob to "T" position (9)
11. Push "TEST/Q/K" (11)
12. Turn "LOAD-SCAN" knob to "P" position (9)
13. Push "TEST/Q/K" (11)
14. Check "ACCUMULATOR" lights; should register 32 (14)
15. Turn "LOAD-SCAN" to "S" position (9)
16. Turn "FORM" to "PC" position (12)
17. Place data forms in hopper

D. If data has several formats, repeat the steps under C using the appropriate Q and K forms.

E. To End Recording of Data

1. On the scanner, push "TAPE MARK" (5)
2. Push "RESET" (D)
3. Push "TAPE MARK" (G)
4. On the recorder, turn center knob to "LOCAL" (3)
5. Push "REVERSE" (5)
6. If tape stops push "REVERSE" again (5)

7. As tape comes off the take-up reel push the white and red switch to turn off the machine (1)

8. Finish rewinding tape by hand

IMS RUN
TYPE [ ] 1 NUMBER [ ][ ][ ] 2-4

Figure 1

IMS RUN CONTROL SHEET - II

Scanner Station

Operator Name _____ Number of Scan Reruns [ ] 7

Date _____/_____ (Mo. / Day) Source Scan Tape No. _____

	1st Run	2nd Run	AVERAGE
Scanner Time On (T6)	____:____	____:____	
Off (T7)	____:____	____:____	
Operating Time (T7-T6)	____:____ Hrs. Min.	____:____ Hrs. Min.	____:____ Hrs. Min.

Comments: _____

_____

_____

690 Station

Scan Tape Processor _____ Number of Processing Reruns [ ] 8

Date _____/_____ (Mo. / Day) Scores Data Input Tape No. _____

Pupil Data Base Tape No. IMS DB _____

RJS Operator _____ Number of Transmission Failures [ ][ ] 9-10

Date _____/_____ (Mo. / Day)

Time Line Up (T8) ____:____ Report Output Tape No. _____

Report Output Tape EOF Time (T9) ____:____ (Hrs. Min.)

Comments: _____

_____

_____

FIGURE 2

Preparing Q and K Control Forms for Data Forms containing PLC Density
(Optional Device 110)

1. Data Form (Reference Figure 8)
2. Q Control Form (Reference Figure 8A)

Placing the Matrix Rule over the example data form as illustrated, shows that the form is designed using PLC density. The rule is used to determine columns by number (1 through 38); a DS1109 form is used to determine lines by number. Auxiliary Line 3 is the first line that will contain data; therefore, it is necessary that Main Line 3 be programmed with Q marks. The completed example shows the placement of Q marks as indicated by the Matrix Rule.

NOTE: Fields located at the right side of the data form are provided for the high-speed printer.

3. K Control Form (Reference Figure 8B)

To provide a reference as to the placement of K marks, the Matrix Rule is used to determine columns by number. All grids on the left side of the data form are designed covering more than 10 response positions (indicators on the Matrix Rule). AK marks are placed on the control form for those grids. Figures 9, 10, and 11, are examples of data forms designed using both PLC and Hi densities. When preparing Q and K control forms for these types of data forms, the same methods will apply as outlined above. However, it is necessary that the PLC indicators on the Matrix Rule be used for the PLC section and the Hi density indicators be used for the sections containing Hi density.

When processing data forms containing PLC density, the scanner always begins scanning in PLC density. It will switch from PLC density to Hi density Identification at the "End of PLC" part mark and from Hi density Identification section to the Hi density Test section at the "End of Identicication" part mark.

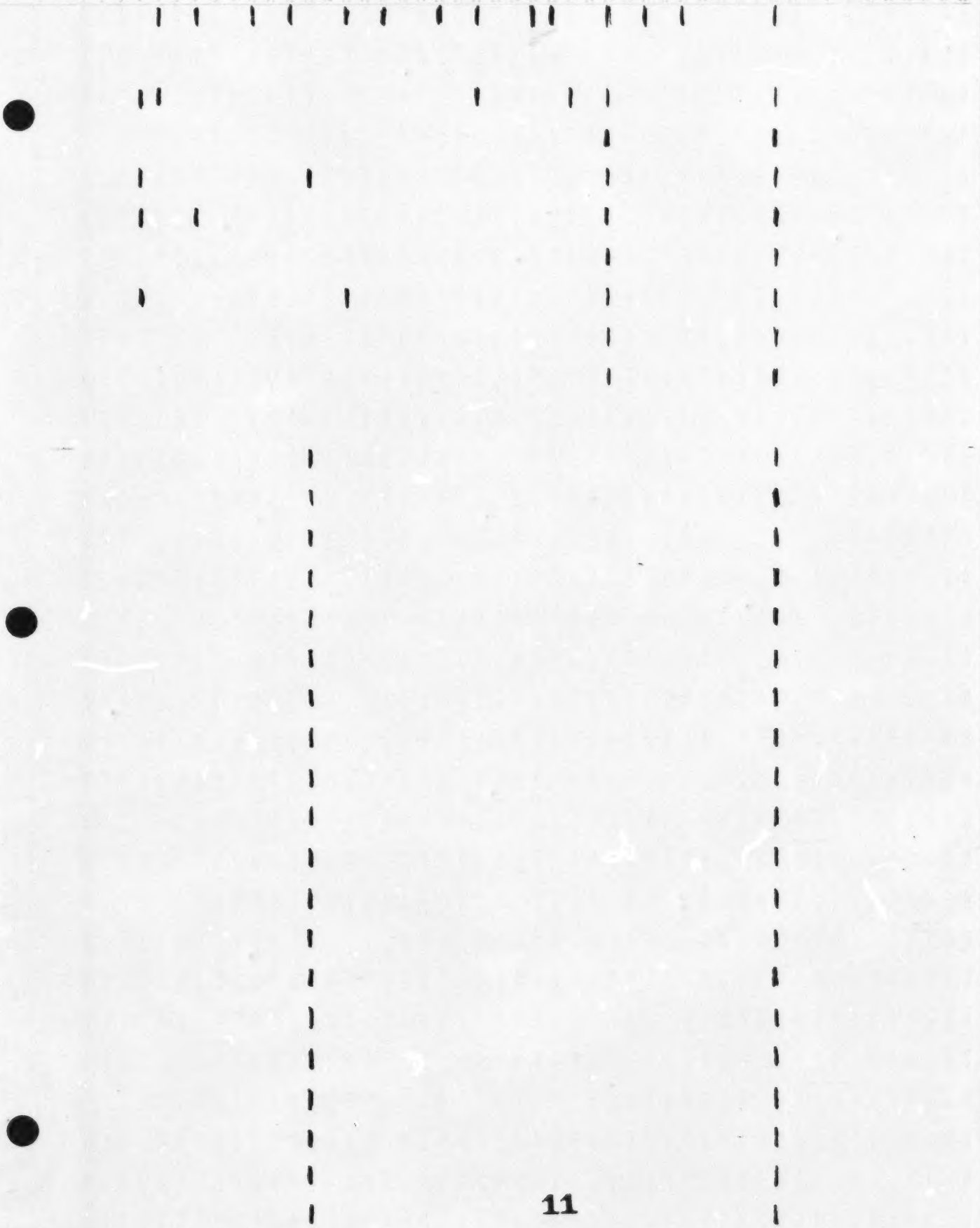
Figure 9, contains a PLC density section, a Hi density Identification section, and a Hi density Test section.

Figure 10 is an example of a data form consisting of a PLC density section and a Hi density Test section. A part mark is programmed at the end of PLC. The normal sequence is to process Hi density Identification, however, there is no Hi density Identification on this form. Another part mark is still required to program the machine from Hi density Identification to Hi density Test. From this point, the same rules apply as per Hi density Test, a part mark indicating end of test parts and end of sheet part mark.

Figure 1' is an example of a data form consisting of a PLC density section and a Hi density Identification section. Since the scanner switching sequence is PLC to Hi density Identification two part marks are used: PLC to Hi density Identification and End of Sheet.

Q Sheet

Figure 3



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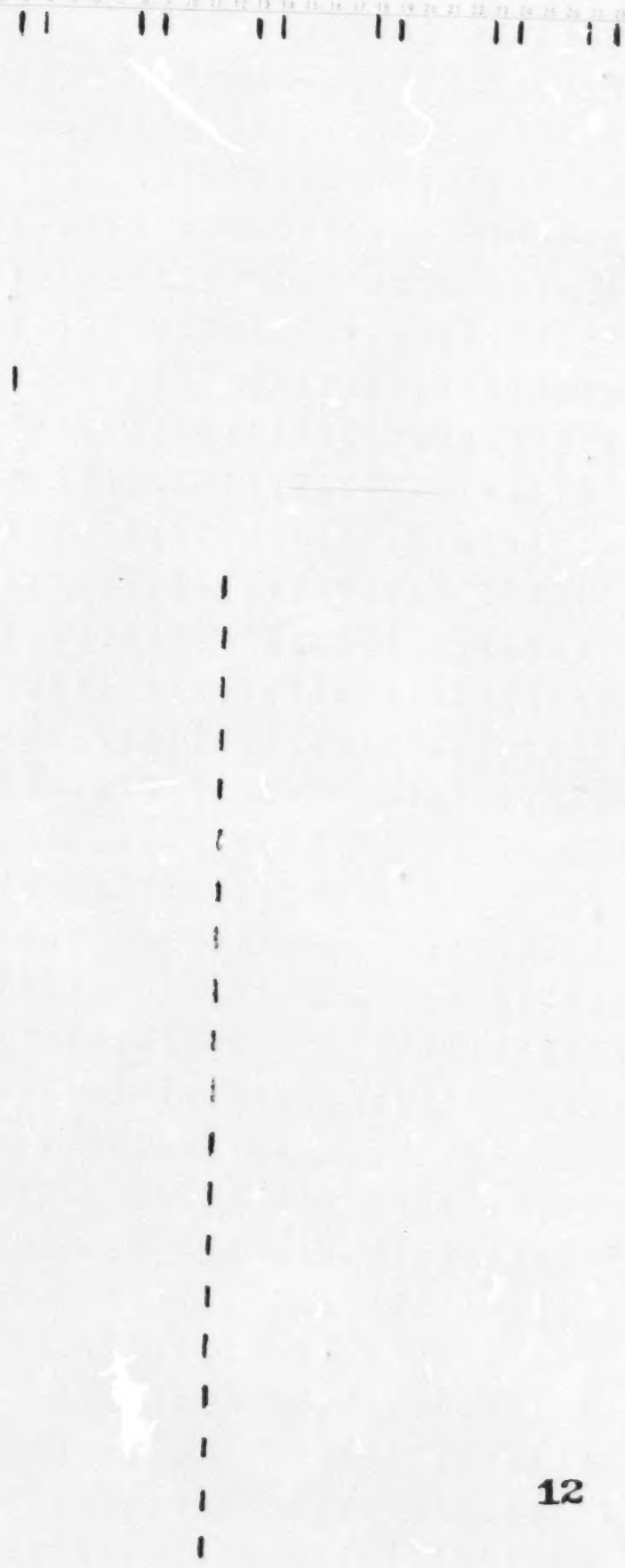
REMINDER: WHEN TYPING LAYOUT, PLEASE MAKE SURE THE RIBBON IS ... OOD CONDITION SO THAT
YOU WILL HAVE A SHARP ... FOR BETTER REPRODUCTION.

K Sheet

Figure 4



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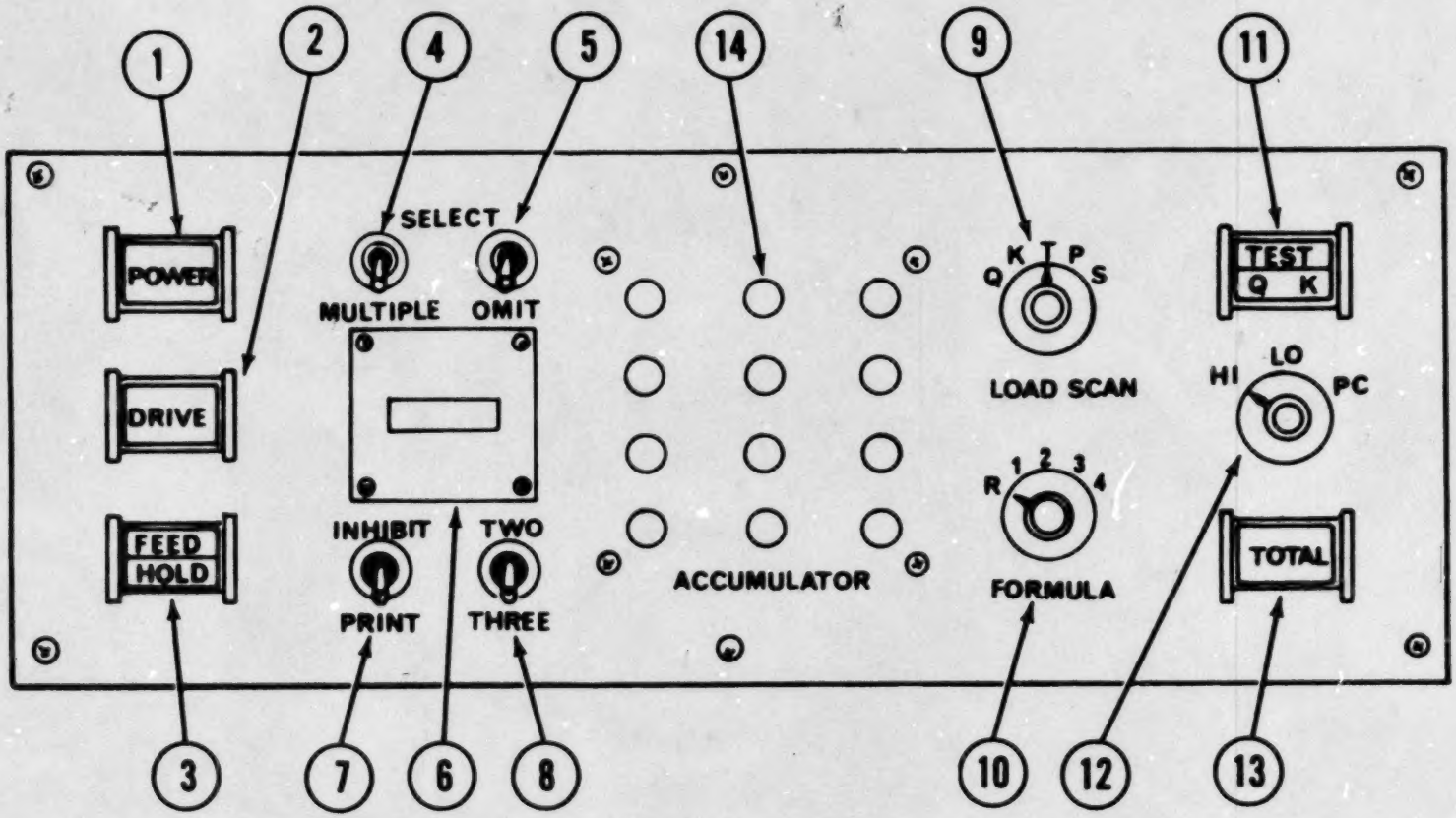
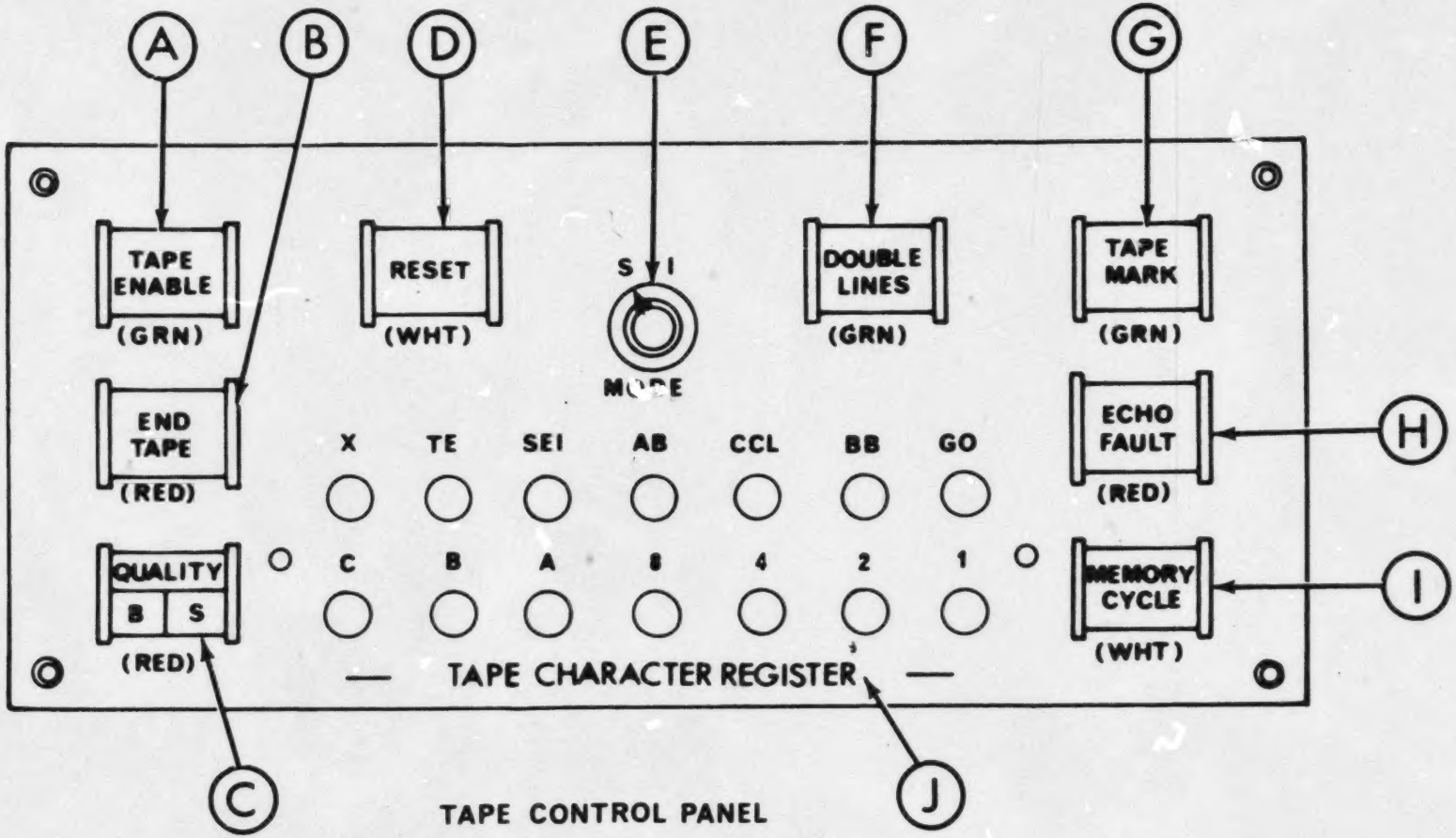

1
2
4
5
14
9
11
POWER
DRIVE
FEED HOLD
SELECT
MULTIPLE
OMIT
INHIBIT
PRINT
TWO
THREE
ACCUMULATOR
Q K T P S
LOAD SCAN
R 1 2 3 4
FORMULA
TEST Q K
HI LO PC
TOTAL
3
7
6
8
10
12
13
SCANNER CONTROL PANEL

Figure 5



TAPE CONTROL PANEL

Figure 6

Figure 7

TAPE DRIVE